Supporting Information

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SI Methods

Procedure. After signing informed consent, subjects entered the scanner. Two high-resolution anatomical scans were acquired for each subject: one before and one after each of two consecutive functional runs, separated by a short break. Sentences were presented in a fixed-random order across the two functional runs, which took ≈12 minutes each. Sentences were presented only once. During the functional runs, subjects passively listened to the sentences without making behavioral responses. Subjects were instructed to pay attention to the sentences because their memory for them might be tested at a later time. Subjects were also instructed to avoid moving. This latter instruction was designed to reduce motion artifact and minimize motor activation that was unrelated to the sentence listening task.

After the scanning session, subjects performed the sentence comprehension task. Each trial began with the auditory sentence, followed by a fixation cross for 250 ms indicating the picture was about to appear. The fixation cross was replaced by a 250-ms blank screen, followed by the picture, which was displayed until participant response.

Data Analysis and Results. ***Sentence comprehension task.*** Both individuals' ability to accurately indicate whether the pictured individual was mentioned in the previous sentence and reaction times (RTs) were measured.

RTs. RTs are reported in the main text. Only RTs for correct trials were included. RTs >2 s were considered outliers and excluded from the analyses (1.06% of the data).

Accuracy. Regardless of one's ice-hockey experience, accuracy was high and did not differ across hockey (M = 91%, SE = 2%) and everyday action (M = 87%, SE = 3%) sentences as a function of whether the pictured individual matched the action implied in the preceding sentence or did not. This was confirmed by a 3 (ice-hockey experience: novice, fan, player) × 2 (sentence: hockey, everyday) × 2 (picture: match, mismatch) ANOVA revealing no hockey experience × sentence type × picture interaction ($F < 1$). All subjects, regardless of hockey experience, were able to understand the sentences such that they could indicate whether a subsequently pictured individual was mentioned in the sentence.

Neuroimaging Data. ***Data preprocessing.*** All preprocessing steps and analyses were conducted by using BrainVoyager QX, 1.9.9 (Brain Innovation). Preprocessing of data included slice scan-time correction, correction for three-dimensional head-motion, mean intensity adjustment at the volume level to correct for scanner-related fluctuations, linear trend removal, spatial smoothing by using a 5-mm full-width at half-maximum Gaussian kernel, and temporal high-pass filtering to remove nonlinear drifts of three cycles or fewer per timecourse.

fMRI data analysis. Analysis of the BOLD signal was based on a multiple regression analysis of each functional time series (1) that took into account sentence type in a random-effects general linear model. The resulting hockey-action and everyday-action condition parameter estimates (β-estimates) for each subject were submitted to separate whole-brain correlation analyses in which the action-match effect for the everyday and hockey sentences was regressed on the contrasts of everyday sentences vs. baseline and hockey sentences vs. baseline, respectively. The two maps generated from this analysis were thresholded at $r(28) = 0.52$, $P < 0.005$, and subsequently cluster-level corrected (2, 3).

In this method, an initial voxel-level (uncorrected) threshold is set. Then, thresholded maps are submitted to a whole-slab correction criterion based on the estimate of the map's spatial smoothness and on an iterative procedure (Monte Carlo simulation) for estimating cluster-level false-positive rates. After 1,000 iterations, the minimum cluster-size that yielded a cluster-level false-positive rate (α) of 0.05 (5%) was used to threshold the statistical maps. For all maps in this analysis, only clusters consisting of 12 or more contiguous functional (3 × 3 × 3 mm) voxels were accepted as showing a significant relation between the action-match effect and neural activity for the relevant sentence type at the whole-brain level. As outlined in the main text, significant regions were then tested to see whether neural activity in that region also related to hockey experience and, furthermore, mediated the relation between hockey experience and hockey language comprehension.

1. Friston K, *et al.* (1994) Statistical parametric maps in functional imaging: A general linear approach. *Hum Brain Mapp* 2:189–210.
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3. Goebel R, Esposito F, Formisano E (2006) Analysis of functional image analysis contest (FIAC) data with brainvoyager QX: From single-subject to cortically aligned group general linear model analysis and self-organizing group independent component analysis. *Hum Brain Mapp* 27:392–401.